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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,407	06/26/2006	Paul Joseph Brooks	0076091-000008	9864

21839 7590 03/20/2012

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ALEXANDRIA, VA 22313-1404

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ART UNIT	PAPER NUMBER
1783	

NOTIFICATION DATE	DELIVERY MODE
03/20/2012	ELECTRONIC

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Application Number: 10/584,407
Filing Date: June 26, 2006
Appellant(s): BROOKS, PAUL JOSEPH

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Shawn B. Cage
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 12/7/2011 appealing from the Office action mailed 6/10/2011.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1, 4, 6-10, 14-18, 21, and 23-24 are finally rejected.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

US 4,479,131	Rogers et al.	10-1984
US 5,882,774	Jonza et al.	3-1999
US 6,587,263	Iacovangelo et al.	7-2003

3M (TM) Radiant Mirror Film VM2000F1A6 Product Sheet

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

Claims 1, 4, 6-10, 14-18, 21, and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 23 recite the limitations of “high absorbency and emissive characteristics”, “low absorbency characteristics”, and “high transmissive characteristics". It is not clear what would be considered high or low in regards to the above material characteristics and in terms of the application for the film for an antenna. Claims 4, 6-10, 14-18, and 21 are further rejected as being dependent upon claim 1.

Claims 1 and 23 also recites the limitation that at 2.5 microns to 50 microns, the interference filter has high absorbency and emissive characteristics and also has low absorbency characteristics in the solar spectrum range from 200-2500 nm. Examiner notes that 2.5 microns is the same as 2500 nm. As such, it is not clear how at 2500 nm or 2.5 microns, the film simultaneously has low absorbency and high absorbency.

Claim Rejections - 35 USC § 103

Claims 1, 4, 6, 9-10, 14, 21, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rogers et al. (***US 4479131***) in view of Jonza et al. (***US 5882774***) with evidence provided by 3M™ Radiant Mirror Film VM2000F1A6 Product Sheet (***Hereafter “Product Sheet”***).

Rogers et al. disclose a thermal protective shield for antenna reflectors. Concerning claim 1, Rogers et al. disclose that the thermal protective shield must be transparent to RF energy for example from 11-15 GHz, high solar reflectance which is about 54% and low absorption which is about 44%, high thermal emittance from the front or solar facing side, low thermal emittance from the back of the back or reflector facing side and low solar transmittance of about 2% through to the antenna (***col. 2, lines 44+***). The thermal protective shield is positioned in front of the RF transmitter or receiver by means of an adhesive or other conventional means (***FIG. 1; col. 2, lines 5+***). The conditions are met through several different embodiments including one embodiment (***FIG. 6***) that is a multilayered semiconductor optical coating that acts as an interference filter to achieve different optical and thermal characteristics wherein the multilayered coating is disposed upon a polyimide substrate (***cols. 5-6, lines 59+***). While it is noted that Rogers et al. are silent to the solar spectrum range and IR range as presently claimed, the disclosure of Rogers of a multilayered semiconductor optical coating that tailored to achieve different optical and thermal characteristics would motivate one of ordinary skill in the art to design the appropriate optical stack that has the presently claimed characteristics. Examiner also notes that the solar radiation spectrum consists of five regions: IR, visible, UVA, UVB, and UVC wherein IR is further divided into IR-A, IR-B, and IR-C. As such, one of ordinary skill in the art would have been able to design a stack that is capable of reflecting and re-radiating in the presently claimed wavelength ranges. However, Rogers et al. are silent to the use of a metal-free thermal control film.

Jonza et al. disclose a multilayer optical film (***abstract***). Concerning claims 1, 4, and 6 Jonza et al. disclose the multilayer optical film allows for construction of mirrors and polarizers wherein said multilayer optical film are comprised of alternating layers of PEN and coPEN wherein the PEN and coPEN for example, and have different refractive indices (***FIG. 1b; col. 2 bridged to 3, lines 63+; col. 5, lines 28+; col. 10-12, lines 31+***). Examiner notes that the desired refractive index relationships can be established by combining a first material that is crystalline or semi-crystalline with a second material that is crystalline, semi-crystalline, or amorphous by stretching during or after film formation, extruding, or coating (***col. 16-17, lines 39+***).

Jonza further discloses that optical properties such as reflectance and polarization vary depending upon the stretching as the stretching goes from uniaxial to biaxial stretching (***col. 3, lines 1+; col. 5, lines 28+; col. 10-12, lines 31+***). Specifically, it is noted that Jonza discloses stretch rate, stretch ratio, and stretch temperature are among the variables that one of ordinary skill in the art could adjust to form the desired optical properties (***col. 18, lines 1+***).

Regarding claim 4, it is noted that since the material as disclosed by Jonza is comprised of the materials as presently claimed in claim 1 (i.e. alternating high/low refractive indices non-metallic layers), the material would be intrinsically flexible. Concerning claims 9-10, Examiner notes that optical properties are known within the art to be strongly influenced by optical thicknesses which is a parameter based upon the physical thickness of each layer. Given the above disclosure, one of ordinary skill in the art by routine experimentation would be able to determine the thickness of the total stack depending upon the desired optical characteristics. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious

to one of ordinary skill in the art to form the appropriate thickness depending upon the desired optical properties.

As evidence by the Product Sheet which discloses a mirror film that is comprised of a film that is similar to that used in the present invention and in Jonza and has wavelength transmission in the near wavelength range as that used in the present invention and an optical reflectivity in the visible light above 95% (***Table***). The mirror film is metal free and thus is non-corroding and non-conductive (***Table***). While it is noted that the mirror film of the Product Sheet is silent to some of the presently claimed material characteristics, it is noted that the disclosure of Jonza explicitly recites that optical properties are dependent upon the processing and optical thickness parameters. As such, it is clear that one of ordinary skill in the art, in order to produce the desired optical performance of a mirror film, would by routine experimentation have produced the presently claimed material properties depending upon the application. Concerning the present limitation of the film stack allowing heat to be dissipated, it is noted that since the combined disclosure appears to be the same as that presently claimed, the film would intrinsically allow for heat to be dissipated by means of the active face. The resultant film as shown by Jonza is metal-free and would thereby meet the limitations of claim 1.

Concerning claim 21, it is noted that the application of a liquid coating to form the film stack is considered a product-by-process given that the resultant film forms a multilayer stack wherein the material limitations can be met by either process. Although Jonza et al. does not disclose applying the interference stack as a liquid onto the substrate, it is noted that "[E]ven

though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process", *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Further, "although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product", *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir.1983). See *MPEP 2113.*

Therefore, absent evidence of criticality regarding the presently claimed application as a liquid coating and given that Jonza meets the requirements of the claimed composite, Jonza clearly meet the requirements of present claim 21. Concerning claim 24, it is noted that Figure 1b shows the interference effects that occur at the interface between high and low refractive index layers. Further, it is noted that optical modeling and different designs are possible based upon the desired end use and optical performance needed wherein there are several equations that can be satisfied (***cols. 7-16***).

All of the elements were known within the art. The only difference is a single disclosure containing all of the presently claimed elements. Rogers et al. disclose a thermal protective shield for antenna reflectors. However, Rogers et al. are silent to the use of a metal-free thermal control film. Jonza et al. disclose a multilayer optical film that can be used in constructing mirrors containing only polymeric material. The mirrors are formed by varying the

stretch ratio (i.e. uniaxial stretching to biaxial stretching), set temperatures, and other known parameters to form the desired optical performance properties. While it is noted that the mirror film of the Product Sheet is silent to some of the presently claimed material characteristics, it is noted that the disclosure of Jonza explicitly recites that optical properties are dependent upon the processing and optical thickness parameters. As such, it is clear that one of ordinary skill in the art, in order to produce the desired optical performance of a mirror film, would by routine experimentation have produced the presently claimed material properties depending upon the application and thereby allow for heat to be dissipated. Further, it is noted that such a mirror film is metal free and thus, will not corrode in corrosive environments. Given that the multilayer stack of Rogers et al. serves as an interference stack for controlling the thermal and optical characteristics of the shield and Jonza with evidence from the Product Sheet disclosing a polymer stack that can be formed into a mirror film that reflects certain wavelengths, it would have been obvious to one of ordinary skill in the art to substitute the interference film of Jonza with the interference film of Rogers et al. in order to increase resistance to corrosion while maintaining the desired optical properties.

Claims 7-8 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rogers et al. (***US 4479131***) in view of Jonza et al. (***US 5882774***) with evidence provided by 3M™ Radiant Mirror Film VM2000F1A6 Product Sheet (***Hereafter "Product Sheet"***) as applied to claims 1 and 14 above, and further in view of Iacovangelo et al. (***US 6587263***).

Rogers et al. and Jonza disclose the above; however, prior art is silent to the filter comprising a silicon-based material.

Iacovangelo et al. disclose optical solar reflectors comprising a substrate, bond layer coating, reflective coating, and radiative layer (***abstract***). Concerning claims 7-8 and 15-16, Iacovangelo et al. disclose the radiative layer is comprised of silicon oxide, silicon nitride, and silicon oxynitride in which the refractive index profile can be modulated to control the amplitude, bandwidth, and wavelength of the rejection bands (***abstract; col. 2, lines 35+***). The thickness of this layer is from 10 to 25 microns (***col. 2, lines 41+***). As shown by Iacovangelo, the radiative layer allows for improved emissivity and absorbency in wavelengths from 200 nm to 2500 nm and far infrared regions (***col. 2, lines 42+***). Regarding the limitation of a plurality of tiles, Iacovangelo et al. disclose the radiative layer is deposited to plates having a reflective layer used in spacecrafts (***col. 4, lines 50+***). The radiative layer comprising such materials allows for improved interfacial CTE matching during thermal cycling, improved optical performance at different wavelengths, and thermal properties (***col. 2, lines 35+***).

All of the elements were known in the art. The only difference is a single disclosure containing all of the presently claimed elements. Rogers et al. and Jonza disclose the above; however, prior art is silent to the filter comprising a silicon-based material. Iacovangelo et al. disclose optical solar reflectors comprising a substrate, bond layer coating, reflective coating, and radiative layer. Given that Iacovangelo et al. disclose the radiative layer comprising silicon oxide, silicon nitride, and silicon oxynitride has improved optical performance in certain wavelengths during thermal cycling, it would have been obvious to one of ordinary skill in the

art to use the materials of Iacovangelo et al. in order to improve optical performance in the desired wavelengths.

(10) Response to Argument

The 35 USC 112, 2^{nd} paragraph rejection of claims 1, 4, 6-10, 14-18, 21 and 23

Appellant asserts that the US 6587263 ("the '263 patent") as cited in the background information sets forth what is considered “high" and "low” with respect to emissivity, absorbency, etc. Examiner respectfully disagrees and notes that these characteristics are only for the radiative layer and said radiative layer is of a different material. There is no indication that this is for the entire structure which is also comprised of reflective elements. . Given that the materials in the ‘263 patent are metals and metalloids having different refractive indices than the polymeric materials preferred in the present invention, it is not clear whether these values would be able to correlate to the present invention. Examiner notes that no examples have been shown that the Applicants have achieved comparable values to the prior art which were clearly shown by the ‘263 patent. Examiner also notes that the substrates upon which the coatings in the ‘263 patent are disposed are metallic and non-transparent whereas the present invention is drawn towards solely transparent substrates (***see para. 0034 of PG-Pub US 20080206534***) which would be markedly different. Examiner also notes that the radiative layer is used with a reflective layer in order to exhibit the properties of "high" and "low" with the metalloid and metal layers whereas the present claims do not recite any reflective material. As

such, the present claims are deemed to be indefinite with respect to the terms "high" and "low".

The 35 USC 103(a) rejection of claims 1, 4, 6, 9-10, 14, 21, 23, and 24 under Rogers et al. in view of Jonza et al. and evidenced from the 3M™ Radiant Mirror Film VM2000F1A6 Product Sheet and rejection of claims 7-8 and 15-18 further in view of Iacovangelo

Appellant asserts that the antenna as shown in Rogers is a passive face. Examiner respectfully disagrees and notes that antenna arrangement can be a receiver or transmitter. If the antenna serves as a transmitter, which would inherently require electric and power components, the antenna as shown would have an active face. Appellant has not shown how a transmitting antenna as explicitly considered by Rogers would not have an active face. Examiner notes that Appellant has not claimed that the thermal film is disposed on the front of an active face. As such, the location of the thermal film can be in any location. Appellant further asserts that the laminate of Rogers does not allow the waste heat to be dumped into space. Examiner notes that drawings shown by Appellant do not accurately portray what is occurring with the laminate of Rogers as well as further asserting again that the IR spectrum range for the radiation generated by the electronic devices includes endpoints that simultaneously have high and low absorbency and emissivity characteristics. Examiner notes that Rogers discloses that there is high thermal emittance when viewed from a front side and some thermal emittance from a back side (***col. 2, lines 44-68***). Given that it is not clear what is

considered “high” and "low”, any emittance value would meet the instant claims and the disclosure of Rogers sets forth a primary reference that would meet the instant claims.

Applicant further asserts that "neither Jonza nor the 3M Product Sheet provides motivation to modify such a film to an active face". Examiner notes that polymeric films having alternating high/low refractive indices are known within the art for thermal control purposes (***See previously cited Russell US 6391400***). Given that Jonza and the 3M Product show that one of ordinary skill in the art can design the same type of film as producing different optical effects based upon the wavelength, it is clear that one of ordinary skill in the art would have been able to design an optical stack as presently claimed.

Examiner also notes that metals are known within the art to corrode based upon the electrochemical potential differences between the metal and the environment said metal is placed in. As such, common sense would lead one of ordinary skill in the art to produce a non-metallic film in order to substitute the multilayer metal film of Rogers with that of Jonza and the 3M Product Sheet in order to combat the effects of corrosion. Furthermore, it is noted that the 3M Product Sheet explicitly recites the motivation of such films being metal-free and therefore non-corroding/non-conductive. Examiner notes that Applicant has admitted that such films are known, commercially available, and further customized to the precise specifications (***para. 0038-0039 of PG-Pub***). Therefore, substituting a metal multilayer film with a polymer film would have been well within one of ordinary skill in the art. As such, the rejections are maintained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/PRASHANT J KHATRI/

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